Access DB# 185352

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Peter Szekely Examiner #: 69764 Date: 4/14/06
Art Unit: 1714 Phone Number ~~30~~ 2-1124 Serial Number: 10/720,469
Mail Box and Bldg/Room Location: Remsen/1029 Results Format Preferred (circle): (PAPER) DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Phosphorus containing polymer compound, synthesising method thereof, antioxidant high-durability polymer electrolyte composite, electrode and fuel cell

Inventors (please provide full names): Takumi Taniguchi; Masayoshi Takami, Masahiro Rikukawa, Yuko Takeoka

Earliest Priority Filing Date: 11/28/02

**For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

See enclosed claims 1-10. Please mark closest prior art. If invention is not found, please state so.

SCIENTIFIC REFERENCE BR
Sci & Tech Inf - Ctr
APR 14 REC'D
Pat. & T.M. Office

****

STAFF USE ONLY	Type of Search		Vendors and cost where applicable	
Searcher: RDS	NA Sequence (#)		STN	✓
Searcher Phone #:	AA Sequence (#)		Dialog	
Searcher Location:	Structure (#)	2	Questel/Orbit	
Date Searcher Picked Up:	Bibliographic		Dr.Link	
Date Completed: 4/21/06	Litigation		Lexis/Nexis	
Searcher Prep & Review Time:	Fulltext		Sequence Systems	
Clerical Prep Time: 30	Patent Family		WWW/Internet	
Online Time: 103	Other		Other (specify)	

PTO-1590 (8-01)

STIC Search Report
EIC 1700

USPTO

STIC Database Tracking Number: 185352

TO: Peter Szekely
Location: REN 10D29
Art Unit : 1714
April 21, 2006

Case Serial Number: 10/720469

From: Ross Shipe
Location: EIC 1700
REMSEN 4B31
Phone: 571/272-6018
Ross.Shipe@uspto.gov

Search Notes

Examiner Szekely:

Please review the attached search results.

I did find some hits and they are marked for you.

I searched by the polymer structure and the registry number for PPBP.

In chemical abstracts, PPBP is classified as an IDE classification in the registry files. Therefore, the structure is not exactly know and could be attached to anything.

If you have any questions or if you would like to refine the search query, please feel free to contact me at any time.

Thanks you for using EIC 1700 search services!

Ross Shipe (ASRC)
Technical Information Specialist

sira
Search and Information Resources Administration

STIC Search Results Feedback Form

EIC17000

Questions about the scope or the results of the search? Contact *the EIC searcher or contact*:

Kathleen Fuller, EIC 1700 Team Leader
571/272-2505 REMSEN 4B28

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* ☐ *Example: 1713*
- *Relevant prior art **found**, search results used as follows:*
  - ☐ 102 rejection
  - ☐ 103 rejection
  - ☐ Cited as being of interest.
  - ☐ Helped examiner better understand the invention.
  - ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature
  (journal articles, conference proceedings, new product announcements etc.)

- *Relevant prior art **not found**:*
  - ☐ Results verified the lack of relevant prior art (helped determine patentability).
  - ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to EIC1700 REMSEN 4B28

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     FILE 'REGISTRY' ENTERED AT 14:56:39 ON 21 APR 2006
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L7              1 SEA ABB=ON  PLU=ON  154100-93-3/RN
L8                STRUCTURE
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                  SAV L9 SZE469/A
L10             0 SEA SUB=L9 SSS SAM L8
L11            28 SEA ABB=ON  PLU=ON  L9 AND P/ELS
L12             1 SEA SUB=L9 SSS FUL L8
                  SAV L12 SZE469A/A

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L15       1053653 SEA ABB=ON  PLU=ON  PHOSPHO?
L16             2 SEA ABB=ON  PLU=ON  L13 AND L15
L17           606 SEA ABB=ON  PLU=ON  L9/D
L18             5 SEA ABB=ON  PLU=ON  L17 (L) L15
L19            30 SEA ABB=ON  PLU=ON  L17 AND L15
L20            10 SEA ABB=ON  PLU=ON  L19 AND (PHOSPHORUS (3A) POLYMER# OR
                  PHOSPHON?)
L21            15 SEA ABB=ON  PLU=ON  L14 OR L16 OR L18 OR L20

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L22             0 SEA ABB=ON  PLU=ON  L7
                  D L21 QUE STAT



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USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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L1                STR
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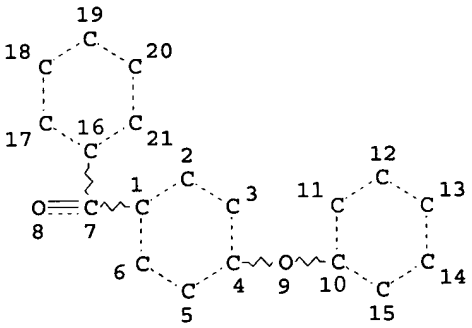


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DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RSPEC  18   1  10
NUMBER OF NODES IS  21

STEREO ATTRIBUTES: NONE
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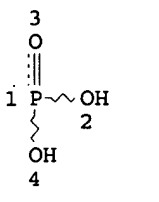


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DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS   4

STEREO ATTRIBUTES: NONE
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L12            1 SEA FILE=REGISTRY SUB=L9 SSS FUL L8
L13           17 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L7/D
L14            1 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L12
L15      1053653 SEA FILE=HCAPLUS ABB=ON  PLU=ON  PHOSPHO?
L16            2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L13 AND L15
L17          606 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L9/D
L18            5 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L17 (L) L15
L19           30 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L17 AND L15
L20           10 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L19 AND (PHOSPHORUS
                 (3A) POLYMER# OR PHOSPHON?)
L21           15 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L14 OR L16 OR L18 OR
                 L20


=> file hcaplus
FILE 'HCAPLUS' ENTERED AT 16:38:04 ON 21 APR 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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=> d l21 1-15 ibib abs hitstr hitind

L21  ANSWER 1 OF 15  HCAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:         2006:293269  HCAPLUS
TITLE:                    Variable charge films for controlling
                          microfluidic flow
INVENTOR(S):              Schlenoff, Joseph B.; Sui, Zhijie
PATENT ASSIGNEE(S):       Florida State University Research Foundation
                          Inc., USA
SOURCE:                   U.S. Pat. Appl. Publ., 32 pp.
                          CODEN: USXXCO
DOCUMENT TYPE:            Patent
LANGUAGE:                 English
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:

     PATENT NO.           KIND   DATE       APPLICATION NO.          DATE
     ---------------      ----   --------   --------------------
     --------
     US 2006065529         A1    20060330   US 2005-70770
                                                                    200503
                                                                    02
PRIORITY APPLN. INFO.:                      US 2004-549341P     P
                                                                    200403
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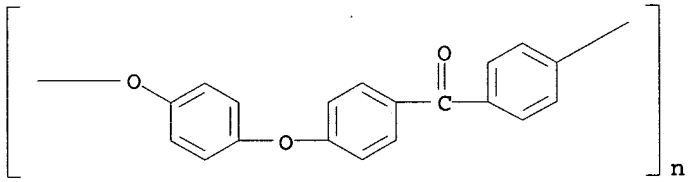
AB A microfluidic device for carrying a liq., the device comprising a microfluidic channel having an interior wall and a polyelectrolyte film on the interior wall whereby liq. carried by the channel contacts the polyelectrolyte film, the polyelectrolyte film having a thickness of .apprx.1 to .apprx.1000 nm and comprising an interpenetrating network of a predominantly pos. charged polymer and a predominantly neg. charged polymer, the predominantly pos. charged polymer, the predominantly neg. charged polymer or both contg. (i) a pH insensitive pos. or neg. charged repeat unit having a pKa greater than ≤9 than 3, and (ii) a pH sensitive repeat unit, the pH sensitive repeat unit having a pKa of 3 to 9, whereby the pH of liq. in the microfluidic channel may be used to control the velocity or direction of electroosmotic flow of the liq. within said microfluidic channel.

IT **31694-16-3D**, sulfonated
RL: NUU (Other use, unclassified); USES (Uses)
(polyelectrolyte complex films for control of the magnitude and direction of electroosmotic flow within microfluidic channels)

RN 31694-16-3 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



INCL 204450000; 204600000

CC 79-2 (Inorganic Analytical Chemistry)

IT **Phosphonates**
RL: NUU (Other use, unclassified); USES (Uses)
(polyelectrolyte complex films for control of the magnitude and direction of electroosmotic flow within microfluidic channels)

IT 7440-21-3, Silicon 7631-86-9, Silica 12597-68-1, Stainless steel 16749-13-6, **Phosphonium** 18155-21-0, Sulfonium 25189-76-8D, Poly[4(5)-vinylimidazole], quaternized 26062-79-3, Poly(diallyldimethylammonium chloride) 50851-57-5, Polystyrenesulfonic acid 53694-17-0, Merquat 281
RL: DEV (Device component use); USES (Uses)
(polyelectrolyte complex films for control of the magnitude and direction of electroosmotic flow within microfluidic channels)

IT 98-70-4, 4-Styrene sulfonic acid 110-86-1, Pyridine 288-32-4, Imidazole 8062-15-5, Sulfolignin 10595-80-9 15214-89-8, 2-Acrylamido-2-methyl-1-propanesulfonic acid 15477-76-6, **Phosphonate** 20284-80-4 31652-17-2 **31694-16-3D**, sulfonated 37275-48-2, Bipyridine 48042-45-1, Diallyldimethylammonium 53232-34-1 53867-17-7 698973-82-9
RL: NUU (Other use, unclassified); USES (Uses)
(polyelectrolyte complex films for control of the magnitude and direction of electroosmotic flow within microfluidic channels)

L21 ANSWER 2 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:681886 HCAPLUS

DOCUMENT NUMBER: 143:327232

TITLE: SAXS/WAXS characterization of proton-conducting polymer membranes containing phosphomolybdic acid

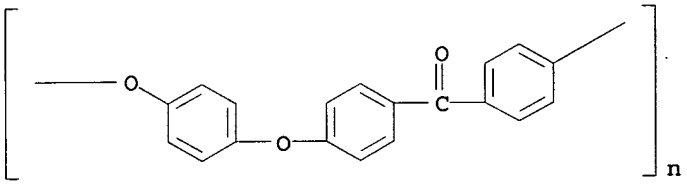
AUTHOR(S): Prado, Luis A. S. de A.; Ponce, M. L.; Funari, S. S.; Schulte, K.; Garamus, V. M.; Willumeit,

R.; Nunes, S. P.
CORPORATE SOURCE: Department of Polymer and Composites, TUHH, Hamburg, D-21073, Germany
SOURCE: Journal of Non-Crystalline Solids (2005), 351(27-29), 2194-2199
CODEN: JNCSBJ; ISSN: 0022-3093
PUBLISHER: Elsevier B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB In the present paper the distribution of phosphomolybdic acid (PMoA, H3PMo12O40) dispersed in sulfonated poly(ether ether ketone), SPEEK, was studied by simultaneous small/wide-angle x-ray scattering SAXS/WAXS technique. The hydrolysis and condensation of 3-aminopropyltrimethoxysilane or zirconium tetrapropylate in these polymeric matrixes were used to produce poly(3-aminopropyl silsesquioxane) or ZrO2, as nano-fillers. Contrary to previous results reported for membranes contg. phosphotungstic acid, the PMoA coalesced into mass-fractal structure, with fractal-dimension 1.85. The largest fractal aggregate was about 524 Å. Moreover, WAXS curves evidenced the crystn. of this heteropolyacid during the casting process. No changes concerning the distribution of PMoA were obsd. in the membranes contg. SPEEK, PMoA and the poly(3-aminopropyl silsesquioxane). No crystn. of the heteropolyacid was obsd. in the membranes contg. ZrO2, although denser surface fractal-like structures constituted by the heteropolyacid were obsd.

IT **31694-16-3D**, Victrex 450P, sulfonated
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(SAXS/WAXS characterization of sulfonated PEEK membrane proton-conducting sulfonated PEEK membranes contg. **phosphomolybdic** acid or zirconium oxide)

RN 31694-16-3 HCAPLUS
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 76

IT **31694-16-3D**, Victrex 450P, sulfonated
RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(SAXS/WAXS characterization of sulfonated PEEK membrane proton-conducting sulfonated PEEK membranes contg. **phosphomolybdic** acid or zirconium oxide)

REFERENCE COUNT: 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L21 ANSWER 3 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:666252 HCAPLUS
DOCUMENT NUMBER: 143:134568
TITLE: Sulfo-containing polyarylene proton-conductive films and their manufacture
INVENTOR(S): Kawai, Junji; Yamakawa, Yoshitaka; Otsuki, Toshitaka
PATENT ASSIGNEE(S): JSR Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 33 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005203316	A2	20050728	JP 2004-10664	200401 19

PRIORITY APPLN. INFO.: JP 2004-10664 200401 19

AB The films, useful for fuel cell electrolytes, contain SO3H-contg. polyarylenes, and low-mol.-wt. acids chosen from **phosphoric** acids, **phosphonic** acids, and sulfonic acids. Thus, a γ-butyrolactone soln. contg. 60 g 2,2-bis(4-hydroxyphenyl)-1,1,1,3,3,3-hexafluoropropane-4,4'-dichlorobenzophenone-neopentyl 4-[4-(2,5-dichlorobenzoyl)phenoxy]benzenesulfonate block copolymer hydrolyzate and 6 g o-ethylphenylphosphoric acid was cast onto a PET film to give a film showing proton cond. 0.31 S/cm at 100°.

IT **852156-73-1DP**, hydrolyzed
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manuf. of sulfo-contg. polyarylene proton-conductive films for fuel cell electrolytes)

RN 852156-73-1 HCAPLUS

CN Benzenesulfonic acid, 4-[4-(2,5-dichlorobenzoyl)phenoxy]-, 2,2-dimethylpropyl ester, polymer with bis(4-chlorophenyl)methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol], block (9CI) (CA INDEX NAME)

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CRN 663920-26-1
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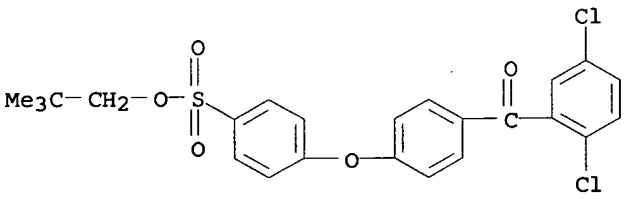
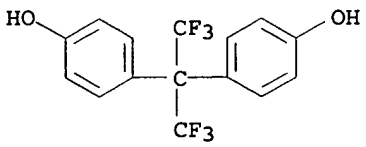


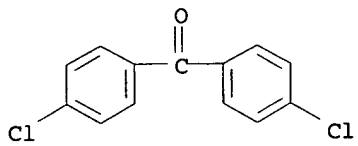
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



IC ICM H01M008-02
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52, 76
ST sulfo polyarylene **phosphoric** acid proton conductive film; **phosphonic** acid sulfo polyarylene proton conductive film; sulfonic acid sulfo polyarylene proton conductive film; fuel cell electrolyte sulfo polyarylene film
IT **852156-73-1DP**, hydrolyzed
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(manuf. of sulfo-contg. polyarylene proton-conductive films for fuel cell electrolytes)
IT 88-20-0, o-Toluenesulfonic acid 13598-36-2D, **Phosphonic** acid, derivs. 175296-85-2
RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(sulfo-contg. polyphenyl-inorg. electrolyte laminates for proton-conductive films for fuel cell electrolytes)

L21 ANSWER 4 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:219954 HCAPLUS
DOCUMENT NUMBER: 142:300971
TITLE: Ion exchange composite material based on proton conductive functionalized inorganic support compounds in a polymer matrix
INVENTOR(S): St.-Arnaud, Marc; Bebin, Philippe
PATENT ASSIGNEE(S): Can.
SOURCE: U.S. Pat. Appl. Publ., 20 pp., Cont.-in-part of Appl. No. PCT/CA03/00435.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005053818	A1	20050310	US 2004-949022	20040924
WO 2003083985	A2	20031009	WO 2003-CA435	20030326
WO 2003083985	A3	20041216		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL,

TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

CA 2494430	AA	20060324	CA 2005-2494430	200501 26
EP 1646097	A2	20060412	EP 2005-20419	200509 20

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, BA, HR, IS, YU

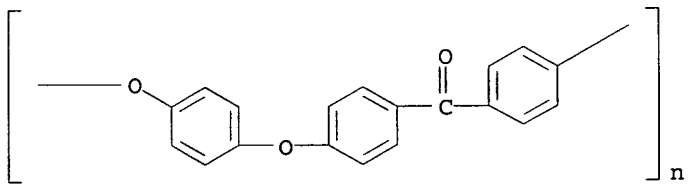
PRIORITY APPLN. INFO.:	US 2002-367771P	P	200203 28
	WO 2003-CA435	A2	200303 26
	US 2004-949022	A	200409 24

AB The composite material comprises acid functionalized inorg. supports such as silica dispersed in a functionalized and/or non-functionalized polymer matrix that is based on numerous polymers such as poly(arom. ether ketones), or poly(benzoyl phenylene), or derivs. thereof. The composite material is characterized by good water retention capabilities due to the acidic functions and the hydrophilicity of the silica particles. Moreover, a good impermeability to gas and liq. fuels commonly used in fuel cell technol., like hydrogen gas or methanol soln., is also obtained due to the presence of silica particles. Good mech. properties of the composite material let the material to be formed easily in thin film or membrane form. In that form, the composite material is usable for proton exchange membrane for fuel cells, for drying or humidifying membrane for gas or solvent conditioning, or as acid catalytic membrane.

IT **31694-16-3D**, PEEK, sulfonated
RL: DEV (Device component use); USES (Uses)
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)

RN 31694-16-3 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM H01M008-10
ICS H01M004-86; H01M004-90; H01M004-96; H01M008-08; H01M008-14; C25B013-00; C25C007-04

INCL 429030000; 429033000; 429046000; 204296000; 429044000; 429041000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 48, 56, 61, 72

IT 110-86-1, Pyridine, processes 302-04-5, Thiocyanate, processes 420-04-2, Cyanamide 661-20-1, Isocyanate 7664-38-2, **Phosphoric** acid, processes 7664-93-9, Sulfuric acid, processes 7803-51-2, Phosphine 13598-36-2, **Phosphonic** acid 13840-40-9, Phosphine oxide 14265-44-2, Phosphate, processes 15477-76-6, **Phosphonate** 32323-01-6, Imide
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)

IT 1314-23-4, Zirconium oxide, uses 1344-28-1, Alumina, uses 7631-86-9D, Silica, acid functionalized 7631-86-9D, Silica, carboxylic acid functionalized 7631-86-9D, Silica, **phosphonic** acid functionalized 7631-86-9D, Silica, propylamine-functionalized 7631-86-9D, Silica, sulfonic acid functionalized 9002-84-0, Ptfe 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-53-6, POlystyrene 9003-56-9, Acrylonitrile-butadiene-styrene copolymer 9004-34-6, Cellulose, uses 13463-67-7, Titanium oxide, uses 24937-78-8, Ethylene-vinyl acetate copolymer 25053-23-0 31694-16-3, Peek **31694-16-3D**, PEEK, sulfonated 150385-13-0, Poly(benzoyl-1,4-phenylene) 223537-84-6
RL: DEV (Device component use); USES (Uses)
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)

IT 7704-34-9D, Sulfur, compd. 7723-14-0D, **Phosphorus**, compd. 7727-37-9D, Nitrogen, compd. 7782-44-7D, Oxygen, compd.
RL: MOA (Modifier or additive use); USES (Uses)
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)

L21 ANSWER 5 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:1060611 HCAPLUS
DOCUMENT NUMBER: 142:41521
TITLE: Electrochemical cell and fuel cell with curable liquid electrolyte
INVENTOR(S): Holdcroft, Steven; Yu, Jianfei
PATENT ASSIGNEE(S): Can.
SOURCE: U.S. Pat. Appl. Publ., 13 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 2004247977	A1	20041209	US 2004-781363		20040218
PRIORITY APPLN. INFO.:			US 2003-476404P	P	20030306

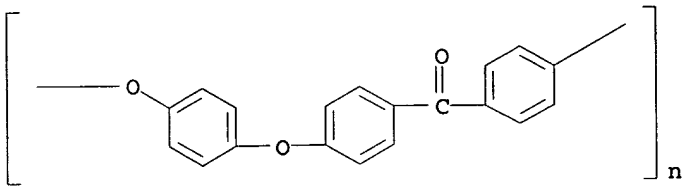
AB This fuel cell or electrochem. cell contains a curable protonic polymer-based electrolyte compn. The electrolyte compn. comprises between 10% and 50% of a protonic polymer with acidic groups for transporting protons, between 10% and 89% of a monomer for dissolving the protonic polymer, between 1% and 60% of a crosslinking agent with at least 2 vinyl functionalities. Upon combining the protonic polymer, monomer and crosslinking agent, a curable electrolyte soln. is formed with ≥50% of the above components, based on the total wt. percent of the formed soln. The invention relates to a method for producing the curable liq.

electrolyte.

IT **31694-16-3D**, PEEK, sulfonated
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(in curable liq. electrolyte for electrochem. cells and fuel cells)

RN 31694-16-3 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM H01M008-10
ICS C08J005-22

INCL 429033000; 429314000; 429317000; 521027000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72

IT Group VA element compounds
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**phosphones**, divinyl and trivinyl derivs., crosslinking agent; in curable liq. electrolyte for electrochem. cells and fuel cells)

IT 79-06-1D, Acrylamide, divinyl and tri-vinyl derivs. 79-39-0D, Methacrylamide, divinyl and tri-vinyl derivs. 96-33-3D, Methylacrylate, divinyl and tri-vinyl derivs. 106-99-0D, Divinyl, org. compd. derivs. 10344-93-1D, Acrylate, divinyl and tri-vinyl derivs. 13598-36-2D, **Phosphonic** acid, divinyl and trivinyl derivs.
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(crosslinking agent; in curable liq. electrolyte for electrochem. cells and fuel cells)

IT 77-77-0, Divinyl sulfone 107-13-1, Acrylonitrile, uses 126-98-7, Methyl acrylonitrile 13598-36-2D, **Phosphonic** acid, derivs. **31694-16-3D**, PEEK, sulfonated 36885-49-1
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(in curable liq. electrolyte for electrochem. cells and fuel cells)

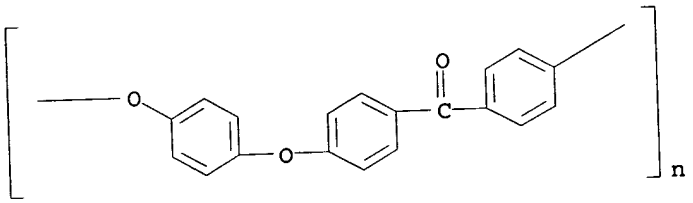
L21 ANSWER 6 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:1060610 HCAPLUS
DOCUMENT NUMBER: 142:41520
TITLE: Electrochemical cell and fuel cell with curable perfluorosulfonate
INVENTOR(S): Holdcroft, Steven; Yu, Jianfei
PATENT ASSIGNEE(S): Can.
SOURCE: U.S. Pat. Appl. Publ., 13 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 2004247976	A1	20041209	US 2004-780968		200402 18
PRIORITY APPLN. INFO.:			US 2003-476330P	P	200306 06

AB A fuel cell and an electrochem. cell comprising a curable perfluorosulfonate ionomer-based electrolyte are presented. The electrolyte contains between 10% and 50% of a perfluorosulfonate ionomer (PFSI) with acidic groups for transporting protons, between 10% and 89% of a monomer for dissolving the PFSI, between 1% and 60% of a cross linking agent having at least 2 vinyl functionalities, and wherein upon combining with the PFSI, monomer and cross linking agent, a curable electrolyte soln. is formed with ≥50% of the above components, based on the total wt.% of the formed soln. The invention relates to a method for producing a curable liq. electrolyte.

IT **31694-16-3D**, PEEK, sulfonated
RL: DEV (Device component use); USES (Uses)
(electrolyte for electrochem. cells and fuel cells contg.)

RN 31694-16-3 HCAPLUS
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM H01M008-10
ICS H01M010-40; C08J005-22
INCL 429033000; 429314000; 429316000; 521027000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
IT 79-06-1, Acrylamide, uses 79-39-0, Methacrylamide 96-33-3, Methylacrylate 10344-93-1, Acrylate, uses 13598-36-2, **Phosphonic** acid
RL: DEV (Device component use); USES (Uses)
(divinyl and tri-vinyl derivs.; in formulation of curable perfluorosulfonate ionomer-based electrolyte for electrochem. cells and fuel cells)
IT 77-77-0, Divinyl sulfone 107-13-1, Acrylonitrile, uses 126-98-7, Methyl acrylonitrile 7732-18-5, Water, uses **31694-16-3D**, PEEK, sulfonated
RL: DEV (Device component use); USES (Uses)
(electrolyte for electrochem. cells and fuel cells contg.)

L21 ANSWER 7 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:1014685 HCAPLUS
DOCUMENT NUMBER: 142:9168
TITLE: Polymer electrolyte, polymer electrolyte membrane, and fuel cell thereof
INVENTOR(S): Rikukawa, Masahiro; Takeoka, Hiroko; Nakamura, Masataka; Ito, Nobuaki
PATENT ASSIGNEE(S): Toray Industries, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 23 pp.

CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004335237	A2	20041125	JP 2003-128679	20030507

PRIORITY APPLN. INFO.: JP 2003-128679 20030507

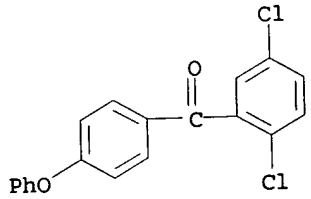
AB The electrolyte is a polymer contg. rigid multifunctional arom. ring repeating units and flexible multifunctional arom. ring repeating units, with part or all the rigid and/or flexible units contain anionic groups, and has a rigid unit/flexible unit ratio = (50-97):(3-50). Preferably the rigid units are p-phenylene units, the flexible units are 0- or m-phenylene units, and the anionic group is selected from sulfonic acid, sulfonylimide, or **phosphonic** acid groups.

IT **798197-22-5D**, sulfonated **798197-29-2D**, sulfonated
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(compns. of arom. polymer electrolytes contg. rigid and flexible arom. repeating units for fuel cell polymer membranes)

RN 798197-22-5 HCAPLUS
CN Methanone, (2,5-dichlorophenyl)(4-phenoxyphenyl)-, polymer with 1,3-dichlorobenzene (9CI) (CA INDEX NAME)

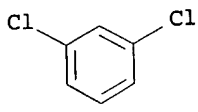
CM 1

CRN 151173-25-0
CMF C19 H12 Cl2 O2



CM 2

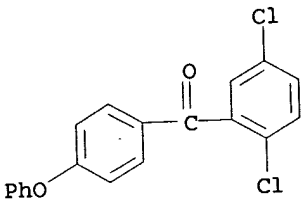
CRN 541-73-1
CMF C6 H4 Cl2



RN 798197-29-2 HCAPLUS
CN Methanone, (2,5-dichlorophenyl)(4-phenoxyphenyl)-, polymer with 1,4-dichlorobenzene (9CI) (CA INDEX NAME)

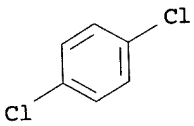
CM 1

CRN 151173-25-0
CMF C19 H12 Cl2 O2



CM 2

CRN 106-46-7
CMF C6 H4 Cl2



IC ICM H01M008-02
ICS C08J005-22; H01B001-06; H01M008-10; C08L065-02
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
IT **798197-22-5D**, sulfonated **798197-29-2D**, sulfonated
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(compns. of arom. polymer electrolytes contg. rigid and flexible arom. repeating units for fuel cell polymer membranes)

L21 ANSWER 8 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:492276 HCAPLUS
DOCUMENT NUMBER: 141:39009
TITLE: Preparation of **phosphorus**-containing polymers for use as antioxidants, highly resistant polymer electrolyte composites, electrodes and fuel cells
INVENTOR(S): Taniguchi, Takumi; Takami, Masayoshi; Rikukawa, Masahiro; Takeoka, Yuko
PATENT ASSIGNEE(S): Toyota Jidosha K. K., Japan
SOURCE: Ger. Offen., 13 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 10355619	A1	20040617	DE 2003-10355619	200311 28
JP 2004175997	A2	20040624	JP 2002-346180	200211 28
US 2004138352	A1	20040715	US 2003-720469	

				200311 25
CA 2451180	AA	20040528	CA 2003-2451180	
				200311 26
PRIORITY APPLN. INFO.:			JP 2002-346180	A 200211 28

AB The title polymers are prepd. by halogenating the phenoxy group of poly[(4-phenoxybenzoyl)-p-phenylenes] (I), displacing the halogen atom with a (dialkoxy)phophoryl group, and hydrolyzing the **phosphonate** ester group. I was brominated to form a p-bromophenoxy group which was treated with HPO(OEt)2 in N-methylpyrrolidone contg. NiCl2 at 155° for 24 h to give a **phosphonate** ester which was hydrolyzed in the presence of Me2S/MeSO3H to give a **phosphonated** polymer. Use of the polymer as an electrode for fuel cells is exemplified.

IT **154100-93-3D**, Poly[(4-phenoxybenzoyl)-1,4-phenylene], **phosphonic** acid derivs.
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(prepn. of **phosphorus**-contg. polymers for use as antioxidants, highly resistant polymer electrolyte composites, electrodes and fuel cells)

RN 154100-93-3 HCAPLUS

CN Poly[(4-phenoxybenzoyl)-1,4-phenylene] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IC ICM C08G061-10
ICS C08G085-00; C08F008-40; C08L065-02; C09K015-32; H01M008-02; H01M004-86

CC 35-8 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 52

ST **phosphonic** acid polymeric prepn; polyphenoxybenzoylphenylene **phosphonic** acid deriv; diethyl **phosphonate** reaction brominated polymer; fuel cell electrode polymer **phosphonated**

IT Antioxidants
(**phosphorus**-contg. polymers for use as antioxidants)

IT Electrodes
Fuel cells
(**phosphorus**-contg. polymers for use as electrodes for fuel cells)

IT Polymer electrolytes
(**phosphorus**-contg. polymers for use as highly resistant polymer electrolyte composites)

IT 154100-93-3, Poly[(4-phenoxybenzoyl)-1,4-phenylene]
RL: RCT (Reactant); RACT (Reactant or reagent)
(bromination and **phosphonation**)

IT **154100-93-3D**, Poly[(4-phenoxybenzoyl)-1,4-phenylene], **phosphonic** acid derivs.
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(prepn. of **phosphorus**-contg. polymers for use as antioxidants, highly resistant polymer electrolyte composites, electrodes and fuel cells)

IT 762-04-9, Diethyl **phosphonate**
RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction with poly[[(bromophenoxy)benzoyl]poly-1,4-phenylene])

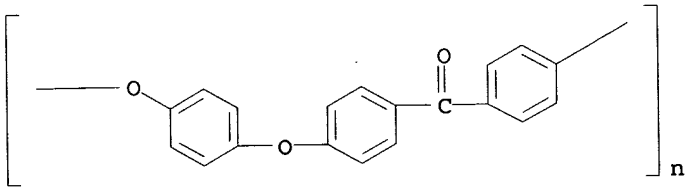
L21 ANSWER 9 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:176758 HCAPLUS
DOCUMENT NUMBER: 140:184664

TITLE: Proton conducting composite membranes from sulfonated polyether ether ketone and phosphotungstic acid
AUTHOR(S): Li, Lei; Xu, Li; Wang, Yu-Xin
CORPORATE SOURCE: Chemical Engineering Research Center, School of Chemical Engineering and Technology, Tianjin University, Tianjin, 300072, Peop. Rep. China
SOURCE: Gaodeng Xuexiao Huaxue Xuebao (2004), 25(2), 388-390
CODEN: KTHPDM; ISSN: 0251-0790
PUBLISHER: Gaodeng Jiaoyu Chubanshe
DOCUMENT TYPE: Journal
LANGUAGE: Chinese

AB A novel inorg.-org. composite membrane, based on sulfonated polyether ether ketone (SPEEK) with embedded phosphotungstic acid (PWA), was prepd. for direct MeOH fuel cells (DMFCs). IR spectroscopy indicated that the PWA was embedded in the SPEEK matrix as a Keggin structure. SEM showed that the solid PWA was well mixed with the SPEEK matrix without agglomeration in the membrane. Proton cond. of the PWA/SPEEK composite membrane is higher than that of a pure SPEEK membrane, and it is similar or superior to that of a Nafion 115 membrane in the temp. range 80-110°. MeOH permeability of the PWA/SPEEK membrane was smaller than that of a Nafion 115 membrane. Because of its high cond. and low MeOH permeability, the PWA/SPEEK membrane is a candidate for DMFC application.

IT **31694-16-3D**, PEEK, sulfonated 12501-23-4
RL: DEV (Device component use); USES (Uses)
(composite **with** phosphotungstic acid; proton-conducting composite membranes of sulfonated polyether ether ketone **and** phosphotungstic acid for fuel cells)

RN 31694-16-3 HCAPLUS
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

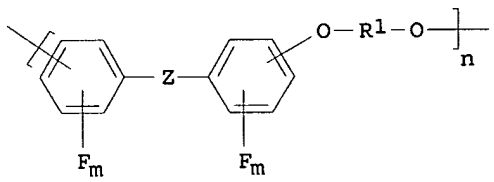
IT **31694-16-3D**, PEEK, sulfonated 12501-23-4
RL: DEV (Device component use); USES (Uses)
(composite **with** phosphotungstic acid; proton-conducting composite membranes of sulfonated polyether ether ketone **and** phosphotungstic acid for fuel cells)

L21 ANSWER 10 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:139363 HCAPLUS
DOCUMENT NUMBER: 140:182769
TITLE: Fluorine-containing poly(aryl ethers), curable compositions, cured materials, adhesives, and ionic conductors therefrom, and manufacture of solvent-soluble engineering plastics therefor
INVENTOR(S): Akutagawa, Hironobu; Omote, Kazushi; Matsumoto, Takeshi; Nishiji, Ai; Yoshida, Masaya
PATENT ASSIGNEE(S): Nippon Shokubai Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 28 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent

LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2004051978	A2	20040219	JP 2003-155624	200305 30
PRIORITY APPLN. INFO.:			JP 2002-160397 A	200205 31

GI



I

AB The F-contg. poly(aryl ethers), showing high heat resistance and mech. strength, contain I units (R1 = C1-150 divalent org. group; Z = divalent org. group, single bond; m = 1-4) and have OH and/or phosphoric acid groups in R1. Solvent-sol. widely-useful engineering plastics are manufd. using compds. contg. 2 of phenolic OH groups and ≥1 alc. OH groups as starting materials. Also claimed are ionic conductors, useful for electrolyte membranes in fuel cells, etc., comprising F-contg. poly(aryl ethers) having OH, carboxy, and/or PO3H groups and proton cond.-imparting agents. Thus, 4,4'-bis(2,3,4,5,6-pentafluorobenzoyl) di-Ph ether was copolymd. with Epicure 171N (resin) to give F-contg. polyether-polyketone, which was mixed with tungstophosphoric acid and cured to give a film showing electrocond. 3.2 + 10-5 and 6.4 + 10-6 S/cm, at 80 and 140°, resp.

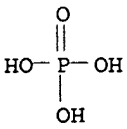
IT **659720-68-0DP**, 4,4'-Bis(2,3,4,5,6-pentafluorobenzoyl) diphenyl ether-Epicure 171N copolymer ester with **phosphoryl** chloride, hydrolyzed
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(fluorine-contg. poly(aryl ethers) showing good heat resistance useful for adhesives and ionic conductors)

RN 659720-68-0 HCAPLUS

CN Methanone, (oxydi-4,1-phenylene)bis[(pentafluorophenyl)-, polymer with Epicure 171N, phosphate (9CI) (CA INDEX NAME)

CM 1

CRN 7664-38-2
CMF H3 O4 P

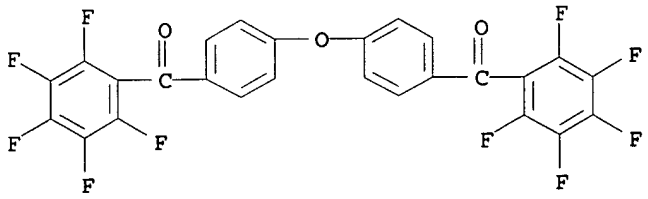


CM 2

CRN 659720-11-3
CMF (C26 H8 F10 O3 . Unspecified)x
CCI PMS

CM 3

CRN 213693-03-9
CMF C26 H8 F10 O3



CM 4

CRN 111274-84-1
CMF Unspecified
CCI PMS, MAN

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IC ICM C08G065-42
ICS H01B001-06; H01M008-02; H01M008-10
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
IT 75-13-8DP, Isocyanic acid, esters, polymers with hydroxy-contg. arom. fluoropolymer-polyether-polyketones 323192-69-4P 659720-08-8P 659720-09-9P 659720-10-2P 659720-11-3P 659720-12-4P **659720-68-0DP**, 4,4'-Bis(2,3,4,5,6-pentafluorobenzoyl) diphenyl ether-Epicure 171N copolymer ester with **phosphoryl** chloride, hydrolyzed 659733-00-3P 659733-01-4P
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(fluorine-contg. poly(aryl ethers) showing good heat resistance useful for adhesives and ionic conductors)

L21 ANSWER 11 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2003:906081 HCAPLUS
DOCUMENT NUMBER: 139:382187
TITLE: **Phosphorus**-containing aromatic dihalides, polyarylenes and sulfonated polyarylenes comprising them, their manufacture, and their antioxidative proton-conductive films
INVENTOR(S): Goto, Kohei; Rozanski, Igor
PATENT ASSIGNEE(S): JSR Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003327674	A2	20031119	JP 2002-135930	

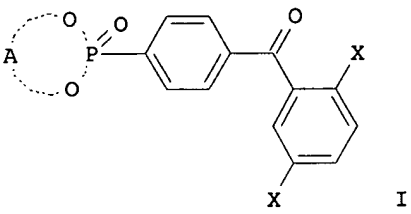
200205
10

PRIORITY APPLN. INFO.: JP 2002-135930

200205
10

OTHER SOURCE(S): MARPAT 139:382187

GI



I

AB The invention relates to P-contg. arom. dihalides I [X = halo excluding F; A = (CR1R2)a(CR3R4)b(CR5R6)c(CR7R8)d; R1-8 = H, alkyl, Ph; a, b, c, d = 0, 1; a + b + c + d ≥2]. Thus, 5,5-dimethyl-2-[4-(2,5-dichlorobenzoyl)phenyl]-2-oxo-2H-1,3,2-dioxaphosphorinane-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone copolymer was sulfonated, dissolved in solvents, cast on a glass substrate, and dried to give a film showing elastic modulus 2.5 GPa, tensile strength 114 MPa, and elongation at break 65%.

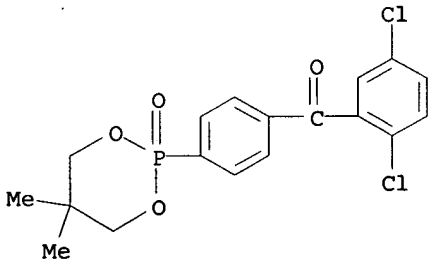
IT **622849-67-6DP**, sulfonated
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(P-contg. sulfonated polyphenyls manufd. from arom. dihalides for antioxidative proton-conductive films)

RN 622849-67-6 HCAPLUS

CN Methanone, (2,5-dichlorophenyl)[4-(5,5-dimethyl-2-oxido-1,3,2-dioxaphosphorinan-2-yl)phenyl]-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone (9CI) (CA INDEX NAME)

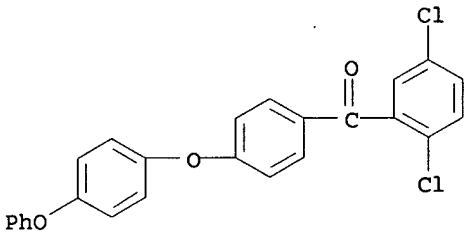
CM 1

CRN 622849-66-5
CMF C18 H17 Cl2 O4 P



CM 2

CRN 463954-50-9
CMF C25 H16 Cl2 O3



IC ICM C08G061-10
ICS C07F009-6574; C08J005-22; C08L065-00
CC 37-3 (Plastics Manufacture and Processing)
Section cross-reference(s): 76
ST **phosphorus** arom dihalide **polymer** film antioxidative; proton conductive film dimethyldichlorobenzoylphenylo xodioxaphosphorinane sulfonated polyphenyl
IT **622849-67-6DP**, sulfonated
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(P-contg. sulfonated polyphenyls manufd. from arom. dihalides for antioxidative proton-conductive films)

L21 ANSWER 12 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2003:797076 HCAPLUS
DOCUMENT NUMBER: 139:294694
TITLE: Ion exchange composite material based on proton conductive silica particles dispersed in a polymer matrix
INVENTOR(S): St.-Arnaud, Marc; Bebin, Philippe
PATENT ASSIGNEE(S): Sim Composites Inc., Can.
SOURCE: PCT Int. Appl., 18 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003083985	A2	20031009	WO 2003-CA435	200303 26
WO 2003083985	A3	20041216		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
CA 2480345	AA	20031009	CA 2003-2480345	200303 26
AU 2003212171	A1	20031013	AU 2003-212171	200303 26
EP 1504486	A2	20050209	EP 2003-707983	

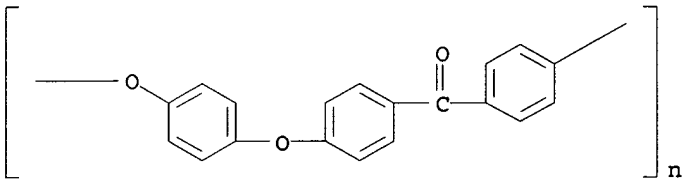
200303
26
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK
JP 2005521777 T2 20050721 JP 2003-581295
200303
26
US 2005053818 A1 20050310 US 2004-949022
200409
24
PRIORITY APPLN. INFO.: US 2002-367771P P
200203
28
WO 2003-CA435 W
200303
26

AB The composite material comprises acid functionalized silica dispersed in a polymer matrix that is based on poly(arom. ether ketones), or poly(benzoyl phenylene), or derivs. thereof. The composite material is characterized by good water retention capabilities due to the acidic functions and the hydrophilicity of the silica particles. Moreover, a good impermeability to gas and liq. fuels commonly used in fuel cell technol., like hydrogen gas or methanol soln., is also obtained due to the presence of silica particles. Good mech. properties of the composite material let the material to be formed easily in thin film or membrane form. In that form, the composite material is usable for proton exchange membrane for fuel cells, for drying or humidifying membrane for gas or solvent conditioning, or as acid catalytic membrane.

IT **31694-16-3D**, Peek, sulfonated
RL: DEV (Device component use); USES (Uses)
(ion exchange composite material based on proton conductive silica particles dispersed in polymer matrix)

RN 31694-16-3 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72

IT 7631-86-9D, Silica, acid functionalized **31694-16-3D**, Peek, sulfonated 150385-13-0, Poly(benzoyl-1,4-phenylene)
RL: DEV (Device component use); USES (Uses)
(ion exchange composite material based on proton conductive silica particles dispersed in polymer matrix)

IT 13598-36-2, **Phosphonic** acid
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(silica particles functionalized with; ion exchange composite material based on proton conductive silica particles dispersed in polymer matrix)

L21 ANSWER 13 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:413359 HCAPLUS
DOCUMENT NUMBER: 139:133954
TITLE: Synthesis and evaluation of **phosphonated** poly(4-phenoxybenzoyl-1,4-phenylene)
AUTHOR(S): Yanagimachi, S.; Kaneko, K.; Takeoka, Y.; Rikukawa, M.
CORPORATE SOURCE: Department of Chemistry, Sophia University, Tokyo, 102-8554, Japan
SOURCE: Synthetic Metals (2003), 135-136, 69-70
CODEN: SYMEDZ; ISSN: 0379-6779
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Poly(4-phenoxybenzoyl-1,4-phenylene) (PPBP), which has high thermal stability and mech. properties, was **phosphonated** by the three-step reaction. The **phosphonated** PPBP (P-PPBP) was characterized by FT-IR, 1H-NMR, elemental anal., and ICP emission spectroscopy. The thermal and elec. properties of P-PPBP were also investigated. The P-PPBP film contg. 40 mol % **phosphonic** acid groups showed a proton cond. of about 10-4 S cm-1 at 90%R.H.
IT **154100-93-3DP**, Poly[(4-phenoxybenzoyl)-1,4-phenylene], brominated, triethylphosphite and then deethyllated derivs.
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(synthesis and evaluation of **phosphonated** poly(4-phenoxybenzoyl-1,4-phenylene))
RN 154100-93-3 HCAPLUS
CN Poly[(4-phenoxybenzoyl)-1,4-phenylene] (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
CC 35-8 (Chemistry of Synthetic High Polymers)
ST **phosphonated** polyphenoxybenzoyl phenylene thermal elec property
IT Ionic conductivity
(proton; synthesis and evaluation of **phosphonated** poly(4-phenoxybenzoyl-1,4-phenylene))
IT Thermal stability
(synthesis and evaluation of **phosphonated** poly(4-phenoxybenzoyl-1,4-phenylene))
IT Polyphenyls
RL: SPN (Synthetic preparation); PREP (Preparation)
(synthesis and evaluation of **phosphonated** poly(4-phenoxybenzoyl-1,4-phenylene))
IT **154100-93-3DP**, Poly[(4-phenoxybenzoyl)-1,4-phenylene], brominated, triethylphosphite and then deethyllated derivs.
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(synthesis and evaluation of **phosphonated** poly(4-phenoxybenzoyl-1,4-phenylene))
REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L21 ANSWER 14 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2001:472016 HCAPLUS
DOCUMENT NUMBER: 135:62388
TITLE: Solid polymer electrolyte having high-durability
INVENTOR(S): Suzuki, Takahisa; Taniguchi, Takumi; Morimoto, Yu; Kawasumi, Masaya; Hasegawa, Naoki; Kamiya, Atsushi
PATENT ASSIGNEE(S): Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan
SOURCE: Eur. Pat. Appl., 37 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

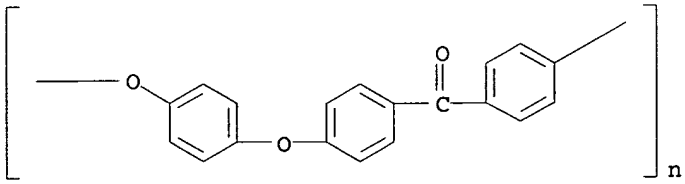
PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1110992	A1	20010627	EP 2000-126079	200011 29
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2001223015	A2	20010817	JP 2000-352300	200011 20
JP 3656244	B2	20050608		
US 2001038937	A1	20011108	US 2000-725267	200011 29
US 6607856	B2	20030819		
PRIORITY APPLN. INFO.:			JP 1999-337015 A	199911 29
			JP 2000-352300 A	200011 20

AB In solid polymer electrolyte having high-durability, comprising a polymer electrolyte material having a hydrocarbon part, a chelate group and an electrolyte group are introduced into the polymer electrolyte material. The chelate group contains a **phosphonic** acid group, nitrogen, both of nitrogen and a **phosphonic** acid group (one or more selected from the group consisting of alkylamino monophosphonic acid groups, alkylamino diphosphonic acid groups, dialkylamino monophosphonic acid groups, alkylalkylene diamine triphosphonic acid groups, and alkylimino **phosphonic** acid groups) or, both of nitrogen and a carboxylic acid group (one or more selected from the group consisting of alkylamino monocarboxylic acid groups, alkylamino dicarboxylic acid groups, dialkylamino monocarboxylic acid groups, alkylalkylene diamine tricarboxylic acid groups, and alkylimino carboxylic acid groups).

IT **31694-16-3DP**, PEEK, **phosphonated**
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(solid polymer electrolyte having high-durability)

RN 31694-16-3 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM C08J005-22
ICS H01M008-10; H01M008-02; C08J005-20

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52

IT Polysulfones, uses
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP

(Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polyether-, **phosphonated**; solid polymer electrolyte having high-durability)

IT Polyethers, uses
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(polysulfone-, **phosphonated**; solid polymer electrolyte having high-durability)

IT **31694-16-3DP**, PEEK, **phosphonated**
31694-16-3DP, PEEK, sulfonated 197895-58-2DP, Ethylene-styrene-tetrafluoroethylene graft copolymer, diethylphosphonated 197895-58-2DP, Ethylene-styrene-tetrafluoroethylene graft copolymer, sulfonated
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(solid polymer electrolyte having high-durability)

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L21 ANSWER 15 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 1996:205338 HCAPLUS
DOCUMENT NUMBER: 124:233506
TITLE: process for **phosphonylating** the surface of an organic polymeric preform
INVENTOR(S): Shalaby, Shalaby W.; McCaig, M. Scott
PATENT ASSIGNEE(S): Clemson University, USA
SOURCE: U.S., 9 pp., Cont.-in-part of U.S. Ser. No. 68,297, abandoned.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 5491198	A	19960213	US 1994-188478	19940128
US 5558517	A	19960924	US 1994-275634	19940715
PRIORITY APPLN. INFO.:			US 1992-840020 B1	19920224
			US 1993-68297 B2	19930527

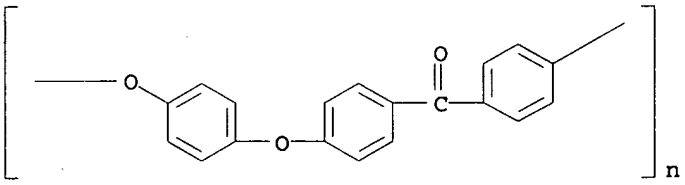
AB Org. polymeric preforms made from various polymers including polyethylene, polyetheretherketone, and polypropylene, and formed into blocks, films, and fibers are surface-**phosphonylated** in a gas phase reaction. The gas-phase **phosphonylation** involves treating the org. polymeric preform with a gaseous **phosphorus** halide such as **phosphorus** trichloride and oxygen. Up to about 30 percent of the reactive carbon sites in the polymer are **phosphonylated.** The **phosphonylated** org. polymers are useful as orthopedic implants because hydroxyapatite-like surfaces which can be subsequently created on the org. implants allow for co-crystn. of

hydroxyapatite to form chem.-bound layers between prosthesis and bone tissue.

IT **31694-16-3DP**, PEEK, **phosphonylated**
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(process for **phosphonylating** the surface of an org. polymeric preform)

RN 31694-16-3 HCAPLUS

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)



IC ICM C08F008-40

INCL 525340000

CC 35-8 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 63

ST **phosphonylation** surface polymer preform; polyethylene **phosphonylation**; PEEK **phosphonylation**; polypropylene **phosphonylation**

IT Carbon fibers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(PEEK composites, **phosphonylated**; process for **phosphonylating** the surface of an org. polymeric preform)

IT Polypropene fibers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(**phosphonylated**; process for **phosphonylating** the surface of an org. polymeric preform)

IT **Phosphonylation**
(process for **phosphonylating** the surface of an org. polymeric preform)

IT Polyketones
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(polyether-, **phosphonylated**; process for **phosphonylating** the surface of an org. polymeric preform)

IT Polyethers, preparation
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(polyketone-, **phosphonylated**; process for **phosphonylating** the surface of an org. polymeric preform)

IT 9003-07-0DP, Polypropylene, **phosphonylated**
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(fiber; process for **phosphonylating** the surface of an org. polymeric preform)

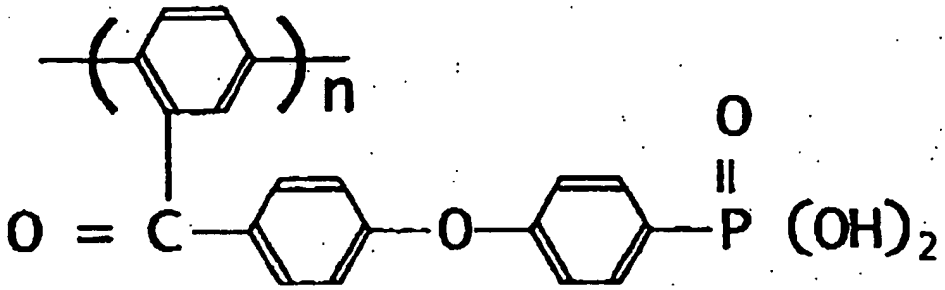
IT 1310-58-3DP, Potassium hydroxide, reaction products with **phosphonylated** polymers 7647-01-0DP, Hydrochloric acid, reaction products with **phosphonylated** polymers 9002-88-4DP, Polyethylene, **phosphonylated** 10043-52-4DP, Calcium chloride, reaction products with **phosphonylated** polymers 24937-16-4DP, Nylon 12, **phosphonylated** **31694-16-3DP**, PEEK, **phosphonylated**
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)
(process for **phosphonylating** the surface of an org.

polymeric preform)
IT 7719-12-2, **Phosphorus** trichloride 7789-60-8,
Phosphorus tribromide
RL: RCT (Reactant); RACT (Reactant or reagent)
(process for **phosphonylating** the surface of an org.
polymeric preform)

=>

WHAT IS CLAIMED IS:

1. Phosphonated poly(4-phenoxybenzoyl-1,4-phenylene) having a following repeating unit.



(It is to be noted in the above formula that "n" represents a number of 5 to 10000.)

2. A method for synthesizing the phosphonated poly(4-phenoxybenzoyl-1,4-phenylene) according to claim 1, comprising:

halogenating a phenoxy group of the poly(4-phenoxybenzoyl-1,4-phenylene) such that the phenoxy group is converted to a halogen group;

phosphonic acid esterifying the halogen group such that the halogen group is converted to a phosphonic acid ester group; and

deesterifying the phosphonic acid ester group.

3. An antioxidant including the phosphonated poly(4-phenoxybenzoyl-1,4-phenylene) according to claim 1.

4. A high-durability polymer electrolyte composite including a fluoropolymer electrolyte and the phosphonated poly(4-phenoxybenzoyl-1,4-phenylene) according to claim 1.

5. The polymer electrolyte composite according to claim 4, wherein a percentage of the phosphonated poly(4-phenoxybenzoyl-1,4-phenylene) content is equal to or higher than 0.1 mass % of the entire polymer electrolyte composite.

6. The polymer electrolyte composite according to claim 5, wherein a percentage of the phosphonated poly(4-phenoxybenzoyl-1,4-phenylene) content is equal to or higher than 5 mass % of the entire polymer electrolyte composite.

7. The polymer electrolyte composite according to claim 4, wherein an antioxidant other than the phosphonated poly(4-phenoxybenzoyl-1,4-phenylene) is added to the polymer electrolyte composite, and a percentage of all antioxidants is 0.005 to 50 mass % of the polymer electrolyte composite.

8. The polymer electrolyte composite according to claim 7, wherein a percentage of the all antioxidants is 0.01 to 10 mass % of the polymer electrolyte composite.

9. An electrode for a fuel cell comprising:
the polymer electrolyte composite according to claim 4 and
a catalyst support conductive material.

10. A fuel cell comprising the electrode according to claim 9.